Final Report

AUDIT OF
PUERTO RICO ENVIRONMENTAL QUALITY BOARD (PREQB): AIR QUALITY AREA/AIR MONITORING, VALIDATION AND DATA MANAGEMENT DIVISION AND QUALITY ASSURANCE/QUALITY CONTROL OFFICE
Ambient Air Monitoring and QA Program
Rio Piedras, PR
July 11, 2016

Auditors:

10/5/16

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10/5/16

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I. INTRODUCTION

On July 11, 2016, EPA Region 2 conducted a Technical System Audit (TSA) of the Puerto Rico Environmental Quality Board (PREQB) ambient air quality monitoring and quality assurance (QA) programs at the PREQB office in Rio Piedras, PR.

The PREQB personnel that participated in this audit were:

Gerardo Santiago - Manager, Air Quality Area

Guillermo Lopez - Supervisor, Electronics Laboratory, Air Monitoring, Validation, Data Management Division, Air Quality Area

Frances Segarra Roman – Acting Chief, QA/QC Office

Cesar Rodriguez – QA/QC Officer, QA/QC Office

The EPA Region 2 personnel conducting the audit were:

Avraham Teitz – Division of Environmental Science Assessment

Mustafa Mustafa - Division of Environmental Science Assessment

All PREQB air monitoring and QA activities were audited, with the exception of the Environmental Laboratory operations, which encompasses the PM2.5 weighing room, PM/Pb filters preparation, weighing and analysis. The Environmental Laboratory operations were audited by the EPA July 28, 2015, and copies of our report and the PREQB Corrective Action Plan are attached electronically to this report, in the Appendix.

This TSA included a visit to the Electronics Laboratory where calibrations, certifications, and repair of field analyzers and calibrators for the gaseous criteria pollutants (CO, SO2, NO2, and O3) are done.

In addition to the TSA and lab visit, field evaluations were done on July 12-14, as part of the EPA Region 2 implementation of the National Performance Audit Program (NPAP) Through the Probe (TTP) audits. Analyzer performance audits and siting criteria evaluations were done at the following field monitoring stations:

11 Final Street, Las Vegas, Cataño: SO2
Rd. 2 Final Las Mareas, Salinas: SO2
Bayamon Regional Jail NCore site: O3
PR 165 Cataño (Police Station) site: O3

The results of the field NPAP TTP audits will be attached to this TSA report as an Appendix and will be submitted to the EPA Air Quality System (AQS) as required.

II. OBJECTIVE

The purpose of this TSA is to assess the performance of PREQB's (Air Monitoring Division and QA/QC Office) ambient air monitoring programs and assure compliance with EPA regulations and guidance. It is required under 40 CFR, Part 58, Appendix A, Section 2.5 that EPA Regional offices conduct Technical Systems Audits (TSAs) of each State's ambient air monitoring program in the Region every 3 years.

III. APPROACH

The basis for this audit was a review and discussion of PREQB's responses to the EPA National Ambient Air Monitoring Technical Systems Audit Form. The audit form was completed by PREQB and submitted to EPA Region 2 prior to this audit meeting. A final copy of the completed TSA form is attached as part of the TSA final report for the record, and a blank copy of the form can be found in Appendix H of the Quality Assurance Handbook for Air Pollution Measurements Systems, Volume II, Ambient Air Quality Monitoring Program.
The Electronics laboratory and four field monitoring stations was visited and inspected this year as part of this TSA. Evaluations of air monitoring field stations and the Electronics laboratory operations are conducted annually as part of EPA's NPAP program.

IV. FINDINGS

1. **Finding:** PREQB does not have a QAPP for its gaseous criteria pollutants (CO, O3, NO2, and SO2) air monitoring and data collection operation. EPA has been requesting PREQB to develop such a QAPP. This is a repeat finding from our 2012 TSA. The only part of the criteria gas monitoring network with a currently approved QAPP is the newly established near-road NO2/CO/PM-2.5 program, was approved and signed on September 8, 2016.

   Citation: As per the EPA Headquarters and Region 2 requirements cited in 40 CFR Part 58, Appendix A, Section 2.1. All air monitoring activities require approved QAPPs in place, prior to the collection and acceptance of data into EPA's AQS ambient air database. In addition, for programs of long duration such as multi-year monitoring programs, QAPPs shall be reviewed annually to determine if any changes are needed. The EPA should be informed if major QAPP changes are planned, in order to determine if QAPP revisions will be required. Approved QAPPs should be revised and updated every 5 years in order to keep up with current methodology and personnel.

   Recommended Corrective Action: PREQB must develop and submit an approvable QAPP for criteria gas pollutants immediately. A draft QAPP submittal was required in January 2016, as part of the S105 work plan.

2. **Finding:** Standard Operating Procedures (SOPs) for ambient air monitoring activities are out of date, incomplete, or unavailable.

   Citation: As per 40 CFR Part 58, Appendix A, 2.1.2: the SOPs can be written as part of the QAPP or referenced by the QAPP as Appendixes for example. The *QA Handbook for Air Pollution Measurements Systems Volume II Ambient Air Quality Monitoring Program Section 5.3* indicates that any environmental data operation (EDO) must include SOPs.

   Recommended Corrective Action: PREQB must develop and update SOPs for all of its current monitoring operations. A table listing all required SOPs and their expected completion date must be provided to EPA within 30 days of this report. The table and SOPs must be reviewed annually, and certified by the PREQB QA/QC Office.

3. **Finding:** At the NCore air monitoring station at the Bayamon Regional 75% of the criteria gas continuous instruments (CO, SO2, and NOy) are not working. Non-operational instruments at this site is a repeat NPAP audit finding. Full results of the annual field NPAP audit are attached in the Appendix.

   Citation: all states including Puerto Rico are required to operate NCore stations as per 40 CFR Part 58, Subpart B, 58.10 a(1) and (3). The EPA requires that data used for compliance with the NAAQS to be 75% complete as shown in Table 6-5 Completeness Goals for Ambient Air Monitoring Data *of the QA Handbook for Air Pollution Measurements Systems Volume II Ambient Air Quality Monitoring Program* in. A 100% data capture from continuous stations such as this one is attainable.

   Recommended Corrective Action: Repair of offline instruments must be done immediately. A schedule of routine maintenance and operational procedures must be developed and submitted to EPA. A plan for minimizing down time, either service contracts or spare parts inventory must be developed. Due to the sophisticated nature of sampling at this site, a dedicated and trained service technician must be assigned to this station. The use of rotating operators, as is the case for other station in the network is unacceptable for this site. A data linkup allowing EPA remote monitoring of instrument readings and calibrations is required, to ensure oversight of performance.

   This station was built and installed for PREQB by EPA's national contractor in 2014. All analyzers were new and in good working order, and further calibrated and adjusted to Federal specifications by EPA Region 2 in August 2014, immediately after the initial install. Neglect of site instrumentation and calibration has been chronic and documented by Region 2 in 2015 and 2016.

4. **Finding:** Continuous analyzers for criteria pollutants in need of repair were observed in the electronics laboratory stacked up on top of each other, as shown in the attached picture in the Appendix. PREQB informed us that lack of funding, delays in the purchase approval process and insufficient repair inventory are the cause of the repair backlog. This is a repeat finding as documented in EPA audits of 2012 and 2013, and has not been addressed for many years.

   Citation: Lack of spare parts and delayed repair of analyzers increase station down time and affect data collection resulting in PREQB failure to meet the 75% data completeness requirement, as stated in the NAAQS as codified in 40CFR Part 50; and as shown in Table 6-5, Completeness Goals for Ambient Air Monitoring Data *of the QA Handbook for Air Pollution Measurements Systems Volume II Ambient Air Quality Monitoring Program* in. A 100% data capture from continuous stations such as this one is attainable.

   Recommended Corrective Action: Repairing these instruments should become PREQB priority. PREQB must provide EPA with a list of analyzers out of service, the required repairs, estimated cost of repairs, date taken out of service, and planned location of redeployment once repaired. Funding can be achieved by increasing the spare parts/repair budget in the coming grant cycle, or in other venues, such as the Multi-Purpose grant.

5. **Finding:** Insufficient storage space for monitoring operation and QA laboratories. The Electronic Laboratory is too crowded with calibration equipment and non-working equipment that comes from the field in need of repair (as described in Finding 4). This is shown in the picture 4, below. In addition, the QA program are forced to store their equipment and standards in the hallways and common space next to their cubicles, because there is no dedicated space for them.

   Citation: There is no specific citation for laboratory and storage space. However, having such space is necessary for safety and required monitoring and QA operations.

   Recommended Corrective Action: PREQB should designate a space for storage and maintenance of QA program field equipment. As out of service equipment in the Electronic Laboratory is repaired, space should be freed up for the calibration and maintenance activities.

V. SUGGESTIONS/RECOMMENDATIONS

1. Accurate flow measurement is the most important step for quality control in ambient air monitoring systems. We recommend that all of the flow measuring standards used by the

air monitoring operations and QA programs be certified by the manufacture every 2 years. Currently this is not being done.

2. We recommend that PREQB develop a system for reviewing their required QA documents QAPPs, QMP, SOPs annually and updating them as needed. The QAPPs and the QMP are good for 5 years, unless the ambient air program and operations experience major changes. This system needs to be included in the QAPP.

VI. COMMENTS/OBSERVATIONS

1. PM2.5 and O3 data will be added to AQI calculations. PREQB will continue to use PM10 data for the AQI due to Sahara dust.

2. The switch to Teledyne-API from Thermo, as PREQB's primary instrument vendor, has not resulted in a noticeable improvement in analyzer field reliability.

3. PREQB is planning to fill 2 vacant air monitoring positions, depending on funding approval. Vacancies are crucial for field operations.

VI. CONCLUSION

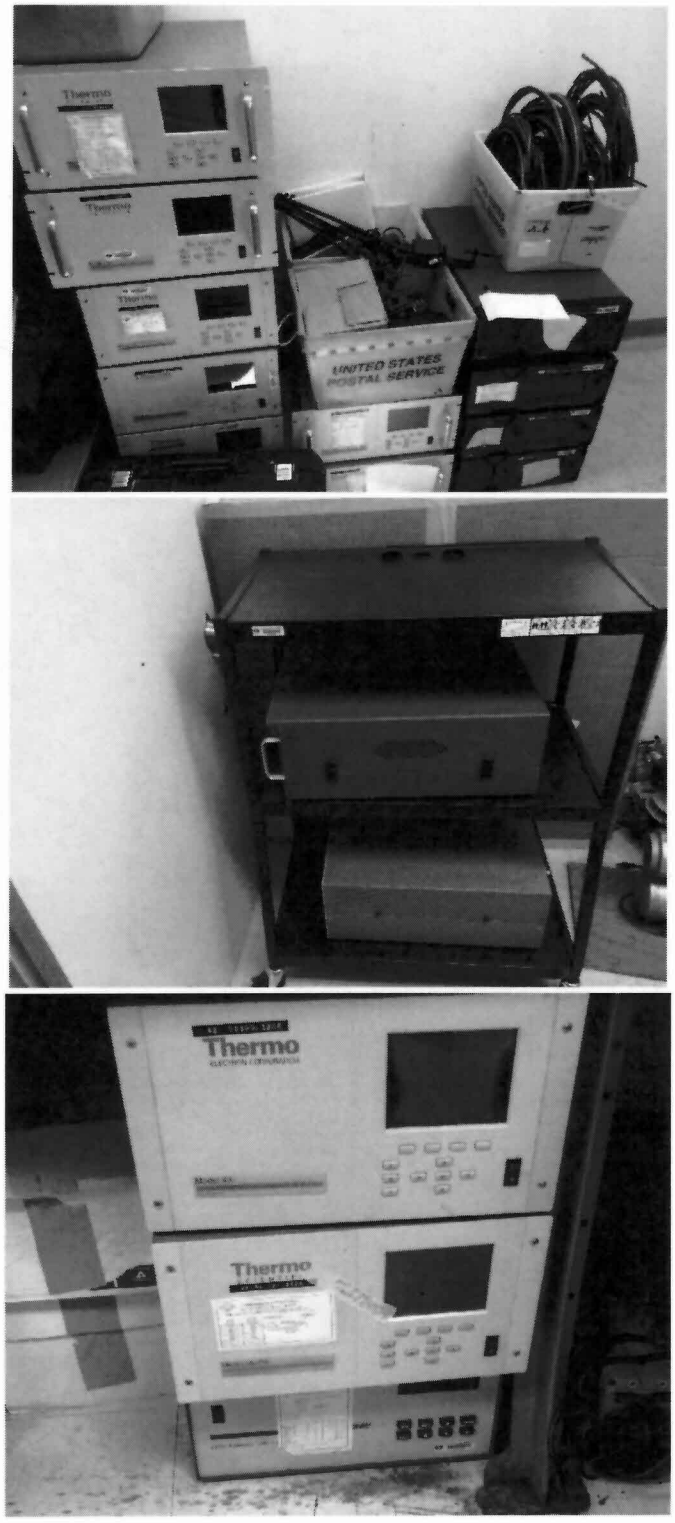
PREQB needs to develop their criteria gaseous monitoring QAPP and to update or develop SOPs for all of their ambient air monitoring operations and to develop a system to review such documents and modify them annually if needed. It is important that the development of the QAPP and other QA documents such as SOPs be done with the assistance and involvement of the QA/QC Office.

PREQB continued to have issues with repairing malfunctioned analyzers to due insufficient funding to purchase spare parts. This is a major problem that will cause downtime leading to PREQB not collecting enough data to meet the 75% completion requirement.

PREQB continues to have problems operating their NCore station. Most of analyzers are not running and generating data.

PREQB needs to submit a corrective action plan to resolve this TSA's findings within 30 days of receiving this report.

Picture 1-3. PREQB Electronics Laboratory - Analyzers Out Of Service, Waiting For Parts.



Picture 4. PREQB Electronics Laboratory – Clutter/instrument Parts.